8) $I=\int_4^2 \frac{dx}{xLn(x)}=\int_4^2 \frac{1/x}{Ln(x)}dx$

$I=\left[Ln\left|Lnx\right|\right]_4^2$

$=Ln\left[Ln(2)\right]-Ln\left[Ln(4)\right]$

$\boxed{I=-Ln(2)}$

9) $I=\int_1^2 \frac{1}{x}Lnx.dx$

$I=\left[\frac{1}{2}(Lnx)^2\right]_1^2$

$\boxed{I=\frac{1}{2}(Ln2)^2}$

10) $I=\int_0^1 \frac{x^2+3x-1}{2x+1}.dx$

Soit :

$f(x)=\frac{x^2+3x-1}{2x+1}$

$f(x)=\frac{x^2+3x+\frac{5}{4}-\frac{9}{4}}{2x+1}$

$f(x)=\frac{\left(x+\frac{1}{2}\right)\left(x+\frac{5}{2}\right)-\frac{9}{4}}{2\left(x+\frac{1}{2}\right)}$

$f(x)=\frac{x+\frac{5}{2}}{2}-\frac{\frac{9}{4}}{2\left(x+\frac{1}{2}\right)}$

$f(x)=\frac{1}{2}x+\frac{5}{4}-\frac{9}{4(2x+1)}$

$I=\left[\frac{x^2}{4}+\frac{5}{4}x-\frac{9}{8}Ln\left|2x+1\right|\right]_0^1$

$\boxed{I=\frac{3}{2}-\frac{9}{8}Ln3}$

EX 7 :

$x\in\left]1,+\infty\right[$

$f(x)=\frac{1}{x^2(x-1)}$

1) $\frac{a}{x}+\frac{b}{x^2}+\frac{c}{x-1}=\frac{(a+c)x^2+(b-a)x-b}{x^2(x-1)}$

Identifions $\begin{cases}a+c=0\\b-a=0\\-b=1\end{cases}$

$\Leftrightarrow\begin{cases}a=-1\\b=-1\\c=1\end{cases}$

D'où

$f(x)=\frac{-1}{x}-\frac{1}{x^2}+\frac{1}{x-1}$

2)

$\int_2^3 f(x)dx=\left[-Lnx+\frac{1}{x}+Ln(x-1)\right]_2^3=Ln\left(\frac{4}{3}\right)-\frac{1}{6}$

3) $I=\int_2^3 \frac{Ln(x-1)}{x^3}dx$

On pose :

$\begin{cases}U'(x)=\frac{1}{x^3}\rightarrow U(x)=\frac{-1}{2x^2}\\V(x)=Ln(x-1)\rightarrow V'(x)=\frac{1}{x-1}\end{cases}$

$I=\left[\frac{-1}{2x^2}Ln(x-1)\right]_2^3+\frac{1}{2}\int_2^3\frac{dx}{x^2(x-1)}$

$I=\frac{-1}{18}Ln2+\frac{1}{2}\left(Ln\frac{4}{3}-\frac{1}{6}\right)$

$\boxed{I=\frac{17}{18}Ln2-\frac{1}{2}Ln3-\frac{1}{12}}$

Qarray.tn -Aqra Blech- Qarray.tn